open-e

EUROstor ES-8724XSS Storage system

Executive summary

After performing all tests, the EUROstor ES-8724XSS has been officially certified according to the Open-E Hardware Certification Program Guide 2.1.

During the tests, it was found that the system is functional and efficient. With the Open-E DSS V7 operating system installed, the EUROstor ES-8724XSS is stable and performs well.

In general, the system can be used for many different applications, but the following are recommended:

✓ **iSCSI storage**

 The following features make EUROstor ES-8724XSS good iSCSI storage:

 ➢ **Four 10GbE and two 25GbE interfaces for fast MPIO connection and flexible network topology.**

 ➢ **Various hardware RAID levels and enterprise class disks for high performance and data safety.**

 ➢ **Redundant power supply for system reliability.**

✓ **Storage for backup**

 For this application the following can be used:

 ➢ **Two 25GbE network interfaces provides enough throughput for demanding backup networks and ensures flexibility in backup network topology.**

 ➢ **Combination of twenty four high capacity SAS hard drives and controller providing high RAID levels, ensures a lot of secure storage space for backups.**

 ➢ **Redundant power supply for system reliability.**

✓ **NAS filer**

 The following features make EUROstor ES-8724XSS a good NAS filer solution:

 ➢ **Hardware RAID5 and RAID6 for fault tolerance and the efficient use of available disk space.**

 ➢ **Twenty four high class SAS hard drives provide a lot of space for user files and ensure good random access speed.**

 ➢ **Four 10GbE and two 25GbE interfaces for independent connection to different networks or link aggregation for improved throughput.**

Certification notes

For link aggregation, it is recommended to use balance-alb or 802.3ad bonding modes.

EUROstor ES-8724XSS hardware components

Technical specifications about the certified system are listed below:

Model	EUROstor ES-8724XSS
Operating system	Open-E DSS V7 build 20188 (Final build will be provided after official release)
Enclosure/chassis	Supermicro SC846BE1C-R1K28B
CPU	Intel® Xeon® Processor E5-1620 v4 3.50 GHz
Motherboard	Supermicro X10SRL-F
Memory	8x 16GB Samsung M393A2K40BB1-CRC DDR4 ECC REG
Network	2x Intel® Ethernet Controller I210-AT (1GbE)
Network	2x QLogic QLE3442-CU (Dual Port 10GbE)
Network	1x QLogic QL45212-CU (Dual Port 25GbE)
HW RAID	Areca ARC-1883LP
Hard disk drives	24x 8TB Seagate ST8000NM0075

TABLE 1: Hardware components list of Certified System with Open-E DSS V7

EUROstor ES-8724XSS photos

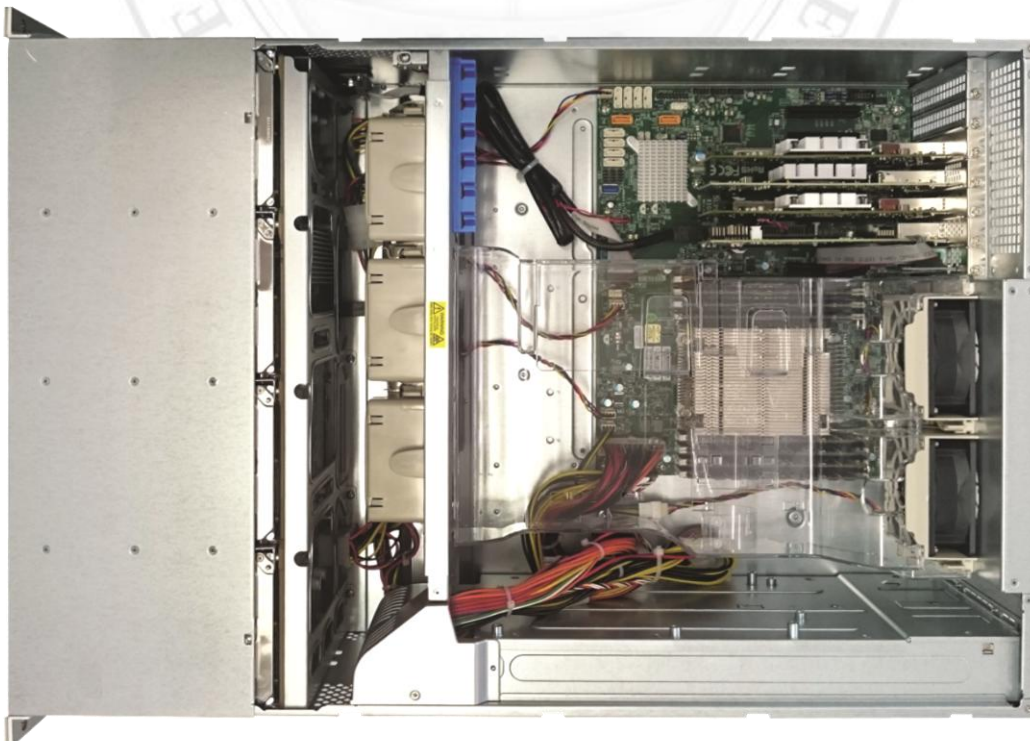*FIGURE 1*: *Front photo*

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FIGURE 2: *Rear photo*

FIGURE 3: *Top photo*

Auxiliary systems hardware components

Auxiliary systems with MS Windows or Open-E DSS V7 installed, used in Open-E Hardware Certification Process.

Model	Custom
Operating system	MS Windows Server 2012 R2
Enclosure/chassis	Supermicro SC826BE1C-R920LPB
Motherboard	Supermicro X10DRi-T
CPU	Intel® Xeon® Processor E5-2623 v3 3.00GHz
Memory	4x 8GB Kingston KVR21R15S4/8HA DDR4 ECC REG
Network	2x Intel® Ethernet Controller X540-AT2 (1GbE)
Network	2x QLogic QLE3442-CU (Dual Port 10GbE)
Network	1x QLogic QL45212-CU (Dual Port 25GbE)

TABLE 2: Hardware components of first Workstation with MS Windows

Model	EUROstor ES-8724XSS
Operating system	Open-E DSS V7 build 20188 (Final build will be provided after official release)
Enclosure/chassis	Supermicro SC846BE1C-R1K28B
CPU	Intel® Xeon® Processor E5-1620 v4 3.50 GHz
Motherboard	Supermicro X10SRL-F
Memory	8x 16GB Samsung M393A2K40BB1-CRC DDR4 ECC REG
Network	2x Intel® Ethernet Controller I210-AT (1GbE)
Network	2x QLogic QLE3442-CU (Dual Port 10GbE)
Network	1x QLogic QL45212-CU (Dual Port 25GbE)
HW RAID	Areca ARC-1883LP
Hard disk drives	24x 8TB Seagate ST8000NM0075

TABLE 3: Hardware components of Workstation with Open-E DSS V7

Model	Supermicro SSE-X24S
Description	24x 10GbE SFP+ Ports

TABLE 4: Network switch details for connection with 1GbE and 10GbE

Administration functionality

The following functionality has been tested.

Drive identifier	OK
Power button	OK
Front and rear LEDs	OK

TABLE 5: Administration functionality test results

Network functionality

Tests performed in this section check the functionality, performance and stability of the network solutions available in the Open-E DSS V7 product on the certified system.

The tests rely on configuring the iSCSI targets and copying the data from many *Workstation with MS Windows* through various network connections with big block size using appropriate testing tools.

Network test topology

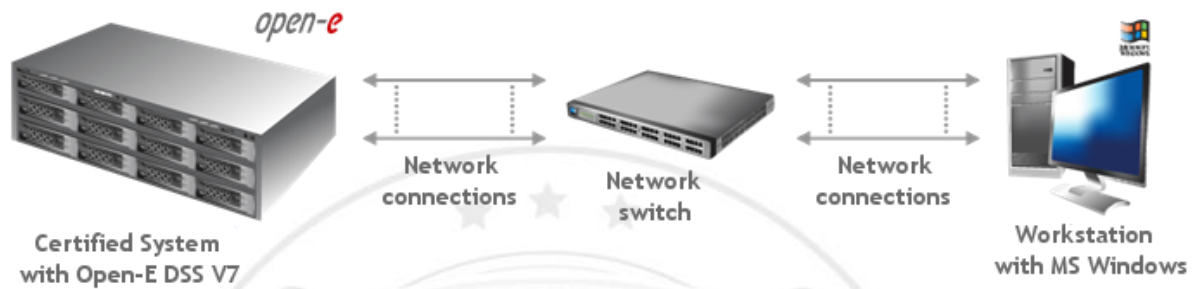Network topology for Network testing is shown below.

FIGURE 4: *Network topology for Network testing*

802.3ad bonding mode test

1. Test description

The test relies on configuring the iSCSI targets and copying the data from many Workstation with MS Windows through an 802.3ad bonding mode network connection with a 4MB block size using the Iometer testing tool.

2. Test results for 802.3ad bonding mode test performed on QLogic QLE3442-CU (Dual Port 10GbE)

802.3ad bonding mode performance test results			
NIC model	QLogic QLE3442-CU 10GbE (Dual Port 10GbE)		
Workstation with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	2262.00	2194.76	passed

TABLE 6: 802.3ad bonding mode performance test results table for QLogic QLE3442-CU (Dual Port 10GbE)
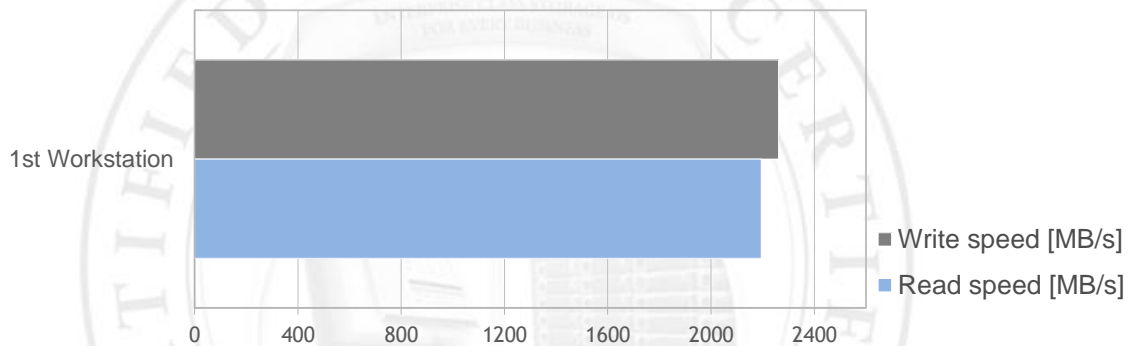

FIGURE 5: 802.3ad bonding mode performance test results chart for QLogic QLE3442-CU (Dual Port 10GbE)

Balance-alb bonding mode test

1. Test description

The test relies on configuring the iSCSI targets and copying the data from many *Workstation with MS Windows* through a Balance-alb bonding mode network connection with a 4MB block size using the Iometer testing tool.

2. Test results for Balance-alb bonding mode test performed on QLogic QLE3442-CU (Dual Port 10GbE)

Balance-alb bonding mode performance test results			
NIC model	QLogic QLE3442-CU (Dual Port 10GbE)		
Workstation with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	2261.95	2202.21	passed

TABLE 7: *Balance-alb bonding mode performance test results table for QLogic QLE3442-CU (Dual Port 10GbE)*
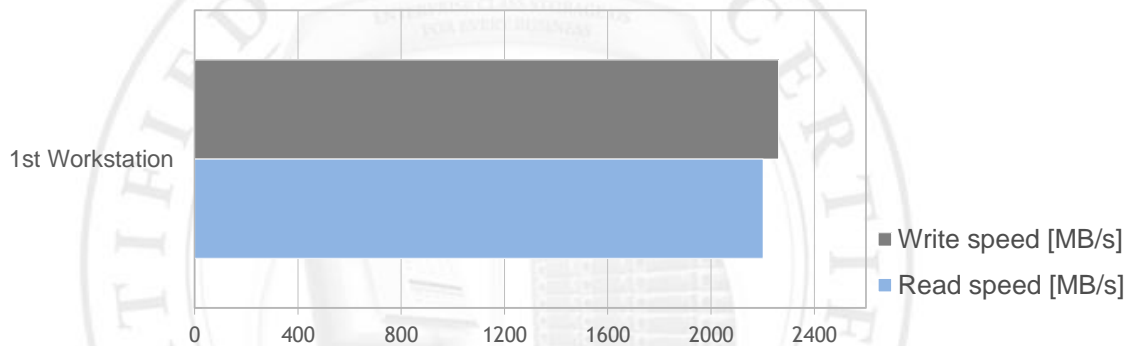

FIGURE 6: *Balance-alb bonding mode performance test results chart for QLogic QLE3442-CU (Dual Port 10GbE)*

Balance-rr bonding mode test

1. Test description

The test relies on configuring the iSCSI targets and copying the data from many *Workstation with MS Windows* through a Balance-rr bonding mode network connection with a 4MB block size using the lometer testing tool.

2. Test results for Balance-rr bonding mode test performed on QLogic QLE3442-CU (Dual Port 10GbE)

Balance-rr bonding mode performance test results			
NIC model	QLogic QLE3442-CU (Dual Port 10GbE)		
Workstation with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	2261.97	2140.08	passed

TABLE 8: *Balance-rr bonding mode performance test results table for QLogic QLE3442-CU (Dual Port 10GbE)*
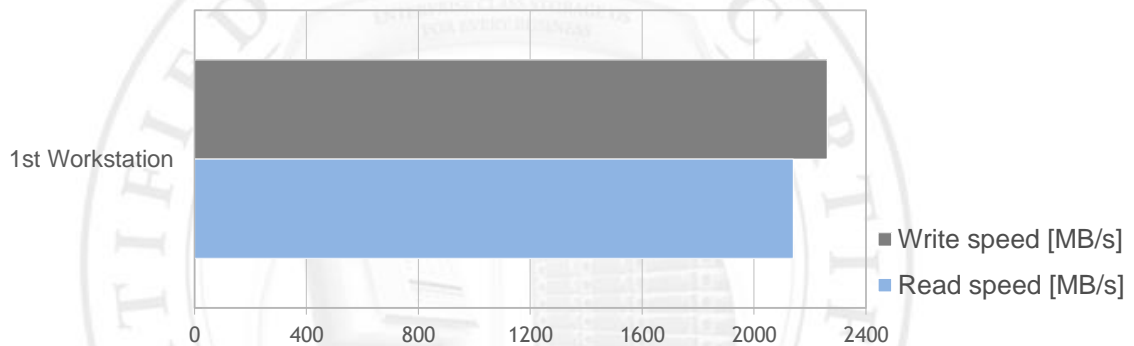

FIGURE 7: *Balance-rr bonding mode performance test results chart for QLogic QLE3442-CU (Dual Port 10GbE)*

Single NIC performance test

1. Test description

The test relies on configuring the iSCSI targets and copying the data from *Workstation with MS Windows* through single NIC with a 4MB block size using the Iometer testing tool.

2. Test results for single NIC test performed on Intel® Ethernet Controller I210-AT (1GbE)

Single NIC performance test results			
NIC model	Intel® Ethernet Controller I210-AT (1GbE)		
Workstation with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	113.08	113.05	passed

TABLE 9: Single NIC performance test results table for Intel® Ethernet Controller I210-AT (1GbE)
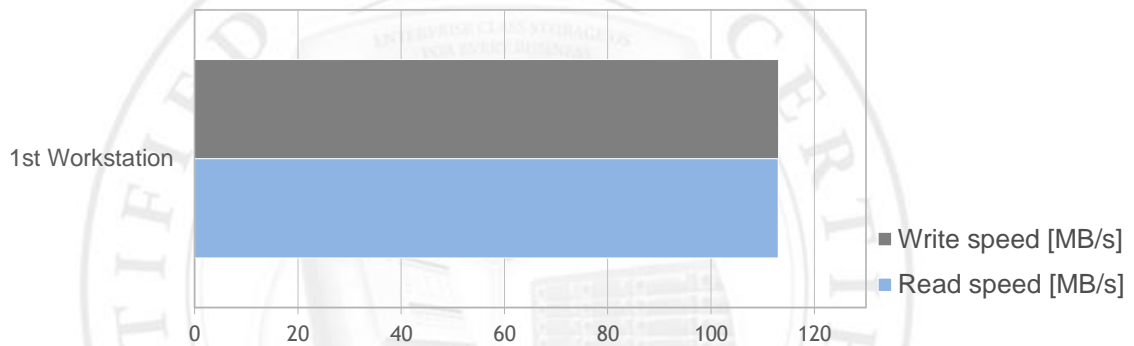

FIGURE 8: Single NIC performance test results chart for Intel® Ethernet Controller I210-AT (1GbE)

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3. Test results for single NIC test performed on QLogic QLE3442-CU (Dual Port 10GbE)

Single NIC performance test results			
NIC model	QLogic QLE3442-CU (Dual Port 10GbE)		
Workstation with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	1129.21	1107.23	passed

TABLE 10: Single NIC performance test results table for QLogic QLE3442-CU (Dual Port 10GbE)
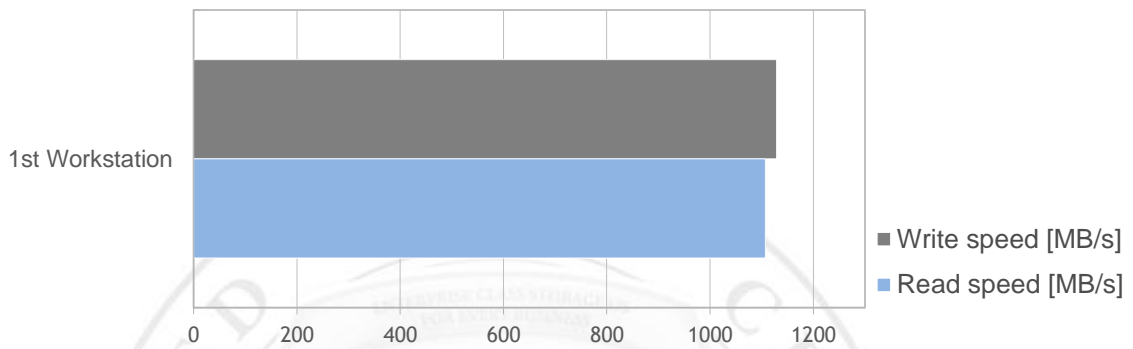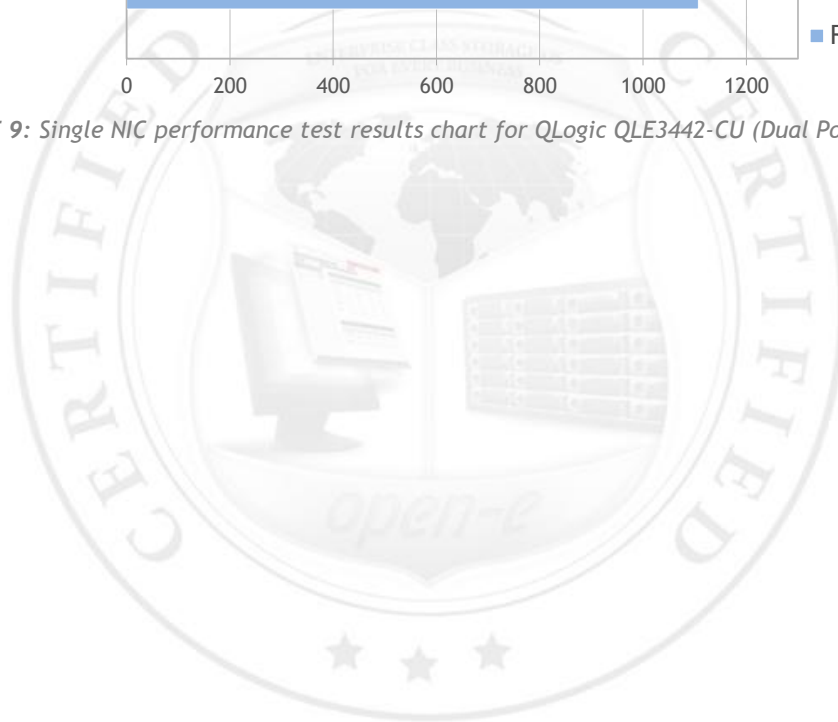

FIGURE 9: Single NIC performance test results chart for QLogic QLE3442-CU (Dual Port 10GbE)

4. Test results for single NIC test performed on QLogic QL45212-CU (Dual Port 25GbE)

Single NIC performance test results			
NIC model	QLogic QL45212-CU (Dual Port 25GbE)		
Workstation with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	2533.19	2541.34	passed

TABLE 11: Single NIC performance test results table for QLogic QL45212-CU (Dual Port 25GbE)
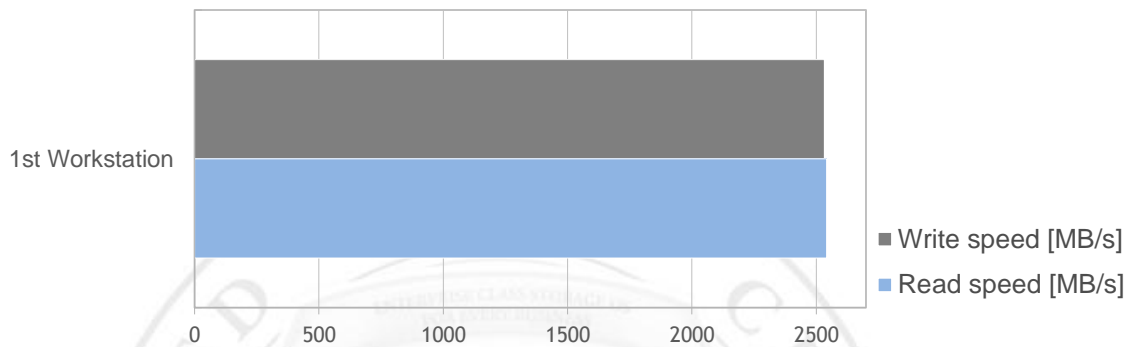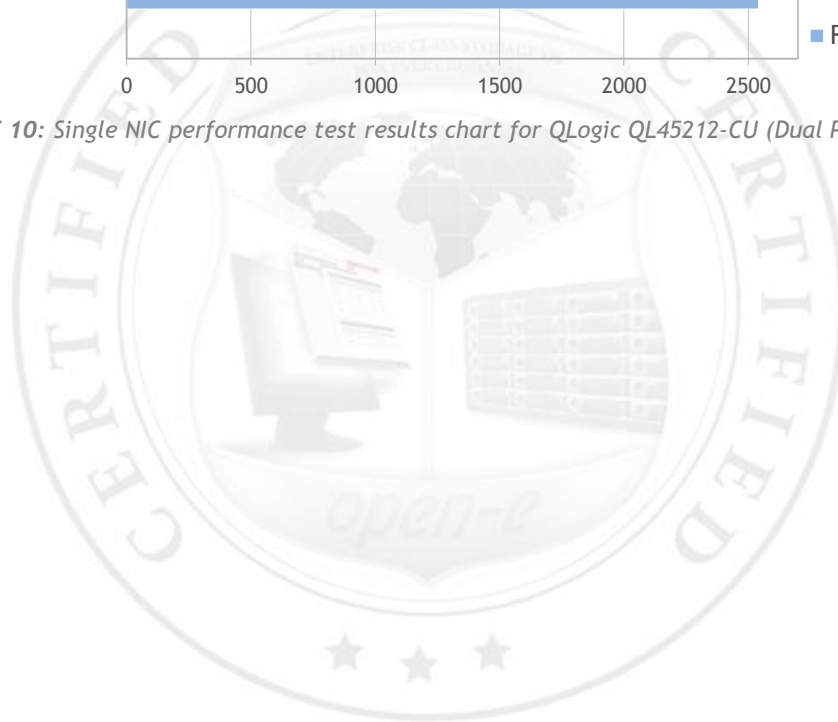

FIGURE 10: Single NIC performance test results chart for QLogic QL45212-CU (Dual Port 25GbE)

RAID functionality

Tests performed in this section check the functionality, performance and stability of Open-E DSS V7 storage devices on the certified system.

Tests in this section rely on the creation of the RAID units on 0, 5, 6, 50 and 60 levels, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the Iometer testing tool.

RAID test topology

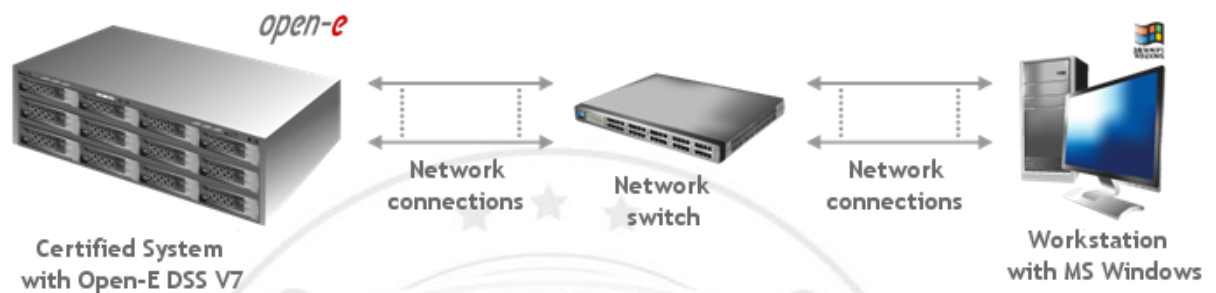Network test topology for RAID testing is shown below

FIGURE 11: *Network test topology for RAID testing*

Hardware RAID0 test

1. Test description

The test relies on creation of the RAID0 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the Iometer testing tool.

2. Test results for RAID0 and 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO

RAID0 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	361.85	349.59	passed
32	1831.05	1643.31	passed
64	2597.78	2427.99	passed
128	3051.42	2893.47	passed
256	3617.89	3271.51	passed
512	4369.01	3914.53	passed
1024	4320.66	3754.19	passed
4096	4324.21	3827.21	passed

TABLE 12: RAID0 performance test results table for 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO
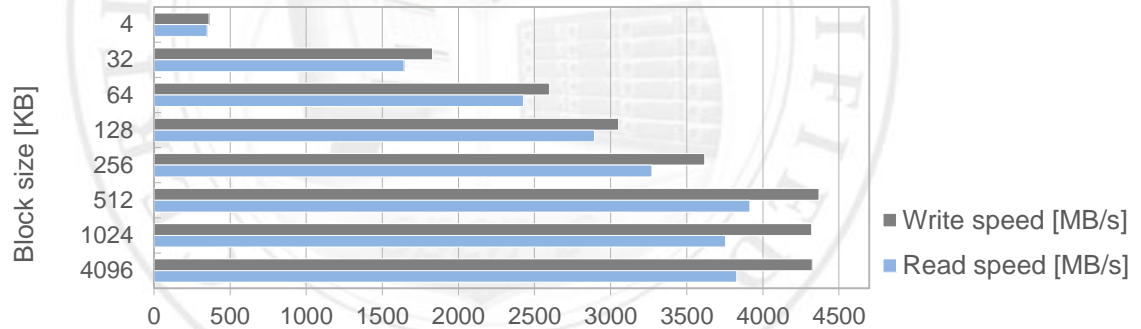

FIGURE 12: RAID0 performance test results chart for 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO

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Hardware RAID5 test

1. Test description

The test relies on creation of the RAID5 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the Iometer testing tool.

2. Test results for RAID5 and 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO

RAID5 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	534.17	550.16	passed
32	2589.22	2271.95	passed
64	3463.67	2430.20	passed
128	3614.65	2320.18	passed
256	3855.71	2570.49	passed
512	3789.78	2806.24	passed
1024	3642.00	2915.60	passed
4096	3764.21	2868.31	passed

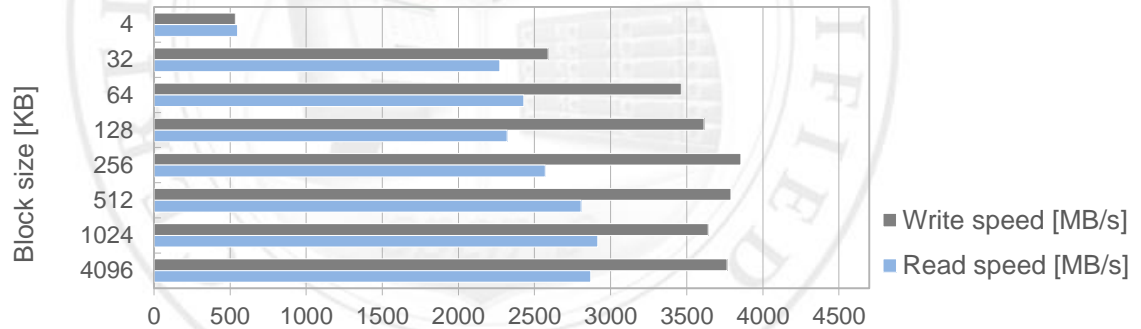TABLE 13: *RAID5 performance test results table for 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO*

FIGURE 13: *RAID5 performance test results chart for 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO*

Hardware RAID6 test

1. Test description

The test relies on creation of the RAID6 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the Iometer testing tool.

2. Test results for RAID6 and 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO

RAID6 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	354.56	367.53	passed
32	1702.20	1609.32	passed
64	2604.77	2249.03	passed
128	3032.55	2445.61	passed
256	3480.82	2718.44	passed
512	3997.92	2982.73	passed
1024	3909.13	3083.67	passed
4096	3963.53	3064.16	passed

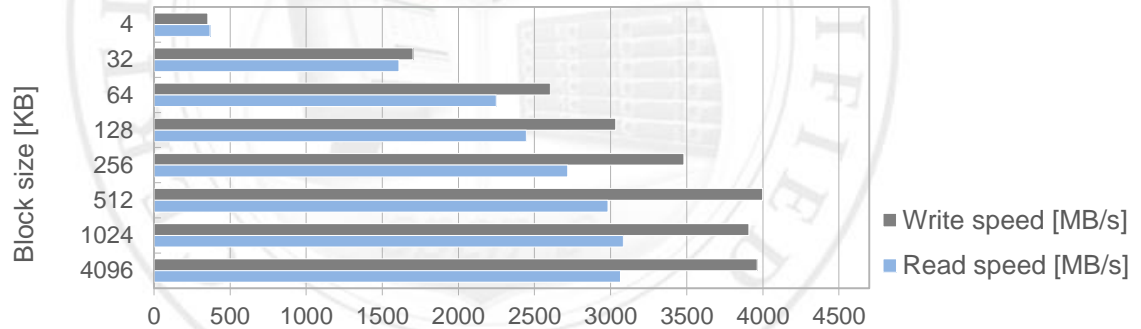*TABLE 14: RAID6 performance test results table for 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO*

FIGURE 14: RAID6 performance test results chart for 4x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO

Hardware RAID50 test

1. Test description

The test relies on creation of the RAID50 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the Iometer testing tool.

2. Test results for RAID50 and 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO

RAID50 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	352.52	370.70	passed
32	1686.45	1603.93	passed
64	2593.19	2265.83	passed
128	3067.69	2480.80	passed
256	3446.62	2844.80	passed
512	3689.40	2974.60	passed
1024	3543.97	2972.69	passed
4096	3404.04	2942.55	passed

TABLE 15: RAID50 performance test results table for 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO
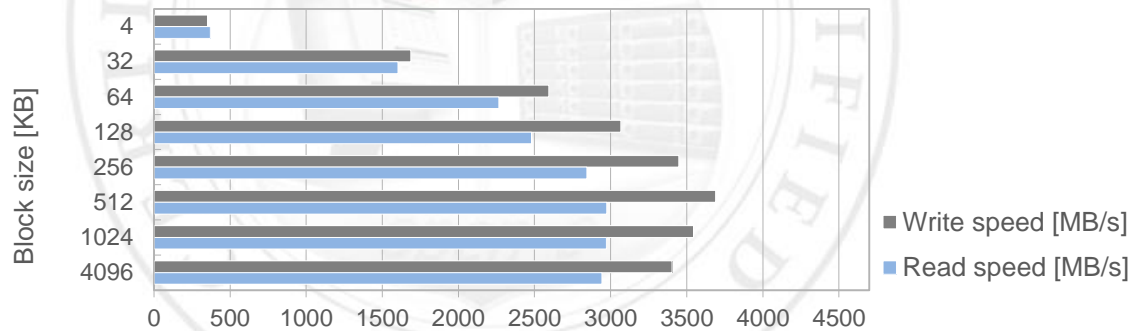

FIGURE 15: RAID50 performance test results chart for 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO

Hardware RAID60 test

1. Test description

The test relies on creation of the RAID60 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the Iometer testing tool.

2. Test results for RAID60 and 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO

RAID60 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	233.99	247.64	passed
32	1108.70	1136.14	passed
64	1950.15	2096.92	passed
128	2207.28	2614.91	passed
256	2958.06	3008.53	passed
512	2638.73	3161.67	passed
1024	2694.25	3144.04	passed
4096	2618.50	3143.47	passed

TABLE 16: RAID60 performance test results table for 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO
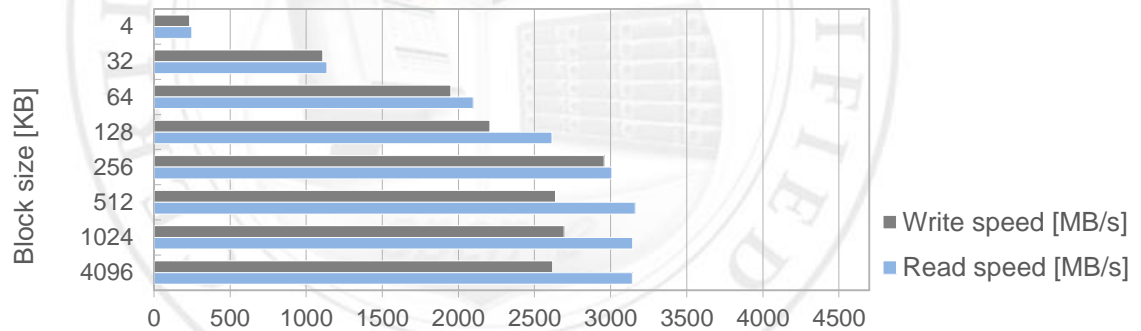

FIGURE 16: RAID60 performance test results chart for 2x QLogic QLE3442-CU (Dual Port 10GbE) with MPIO

NAS functionality

Tests performed in this section check the functionality, performance and stability of the NAS protocols in the Open-E DSS V7 product on the certified system.

The tests rely on creating NAS shares and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the Iometer testing tool.

NAS test topology

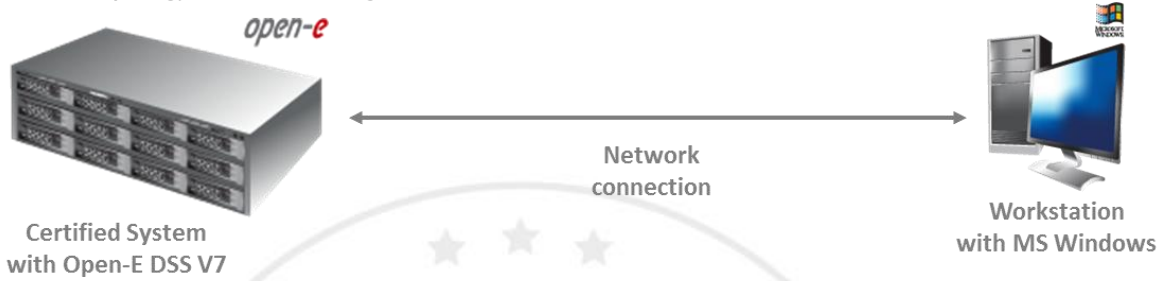Network topology for NAS testing is shown below.

Certified System with Open-E DSS V7

Network connection

Workstation with MS Windows

FIGURE 17: Network topology for NAS testing

SMB test

1. Test description

The tests rely on creating NAS shares and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the Iometer testing tool.

2. Test results for SMB and QLogic QL45212-CU (Dual Port 25GbE)

SMB performance test results			
Block size [KB]	**Write speed [MB/s]**	**Read speed [MB/s]**	**Performance test results**
4	183.80	401.50	passed
32	1135.49	1728.92	passed
64	1413.52	2087.70	passed
128	1809.63	2169.16	passed
256	1955.93	2142.08	passed
512	1868.53	2151.57	passed
1024	1907.11	2024.98	passed
4096	1943.76	2041.00	passed

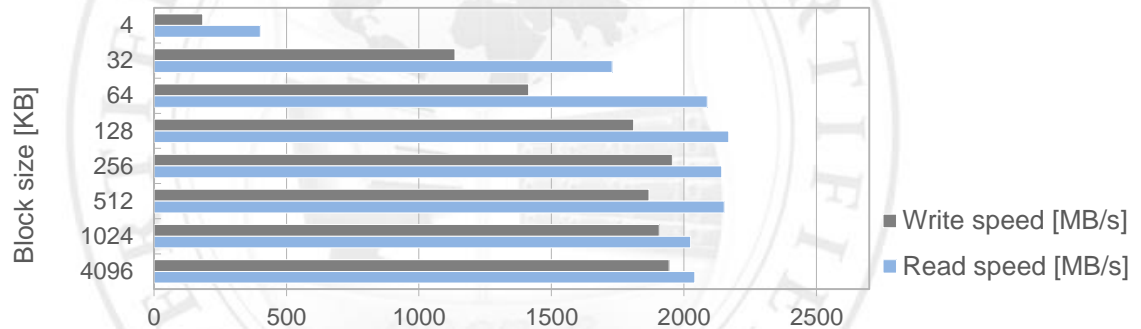*TABLE 17: SMB performance test results table for QLogic QL45212-CU (Dual Port 25GbE)*

FIGURE 18: SMB performance test results chart for QLogic QL45212-CU (Dual Port 25GbE)

iSCSI functionality

Tests performed in this section check the functionality, performance and stability of the iSCSI protocol in the Open-E DSS V7 product on the certified system.

iSCSI Initiator test topology

Network topology for iSCSI Initiator testing is shown below.

FIGURE 19: Network topology for iSCSI Initiator testing

iSCSI Target test topology

Network topology for iSCSI Target testing is shown below.

FIGURE 20: Network topology for iSCSI Target testing

iSCSI Initiator test

1. Test description

The test relies on using the storage connected via the built-in iSCSI Initiator for NAS volumes, creating SMB shares on these NAS volumes and copying data from a *Workstation with MS Windows* to them with various block sizes using the Iometer testing tool.

2. Test results for iSCSI Initiator and QLogic QLE3442-CU (Dual Port 10GbE)

iSCSI Initiator performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	137.31	134.19	passed
32	806.73	682.40	passed
64	1116.22	1079.24	passed
128	1105.25	1051.04	passed
256	1092.25	1109.56	passed
512	1088.65	1122.41	passed
1024	1122.09	1126.55	passed
4096	1090.02	1053.12	passed

TABLE 18: *iSCSI Initiator performance test results table for QLogic QLE3442-CU (Dual Port 10GbE)*
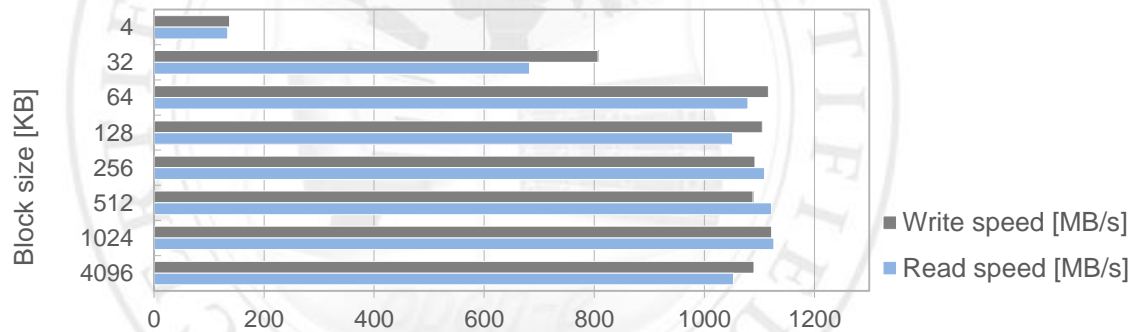

FIGURE 21: *iSCSI Initiator performance test results chart for QLogic QLE3442-CU (Dual Port 10GbE)*

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iSCSI Target test

1. Test description

The test relies on creating the iSCSI target on the certified system and copying the data from a *Workstation with MS Windows* to it with various block sizes using the Iometer tool.

2. Test results for iSCSI Target and QLogic QL45212-CU (Dual Port 25GbE)

iSCSI Target performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	256.06	221.02	passed
32	1433.42	894.92	passed
64	2209.88	1079.88	passed
128	2241.48	1466.72	passed
256	2252.64	1931.27	passed
512	2259.81	1931.36	passed
1024	2256.37	1647.76	passed
4096	2260.95	1657.21	passed

TABLE 19: iSCSI Target performance test results table for QLogic QL45212-CU (Dual Port 25GbE)
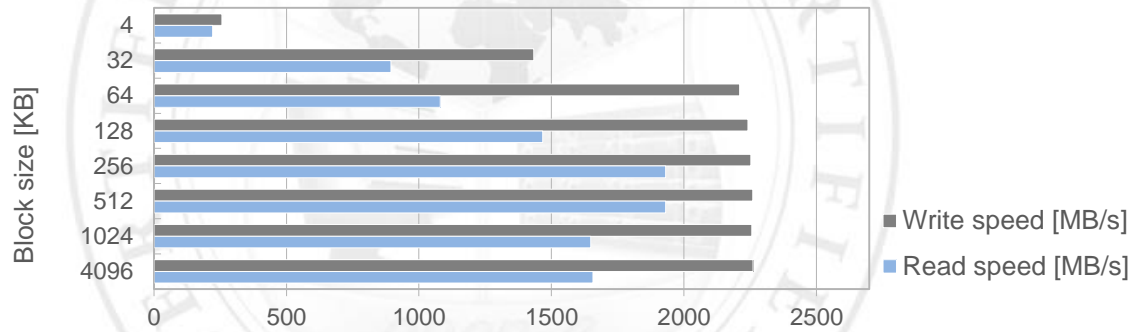

FIGURE 22: iSCSI Target performance test results chart for QLogic QL45212-CU (Dual Port 25GbE)